Delta Air Lines, Inc.
Flight Safety Program
"Risk Analysis and Measuring Safety Performance"

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Risky?

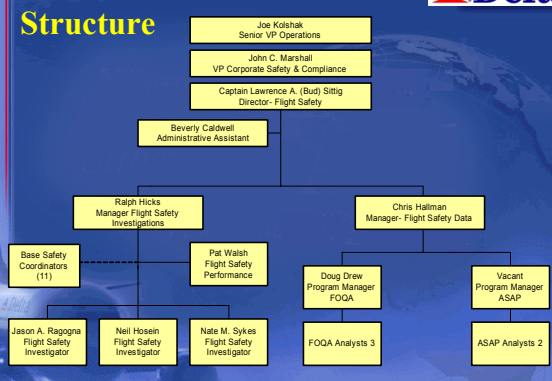
Overview

- Mission, Structure and Strategy
- Flight Operational Quality Assurance (FOQA)
- Line Operations Safety Audit
- (LOSA)
- Aviation Safety Action Program
- (ASAP)
- Incident Investigations
- Communication Programs
- Measuring Performance

Flight Safety Mission

Support Delta's core commitment to safety by assisting operating departments with ***identifying, evaluating, and addressing*** the hazards (risks, threats) associated with aircraft operations.

Structure



Why Place an Emphasis on Safety?

Strategy

- Classic Risk Management
  - Collect data
  - Identify & evaluate accident precursors
  - Develop, communicate & implement countermeasures

Flight Operational Quality Assurance (FOQA)

- Joint Delta/ALPA/FAA Safety Program
- Cornerstone of Delta's proactive program since 1997
- Collects and analyzes digital flight data from aircraft during normal line operations

Current Delta FOQA Fleet

- B737-800
- B757
- B767-400
- B777
- 209 Total aircraft
  - Expanding with the addition of MD-88
  - 450 aircraft by end of 2004

FOQA

- Purpose
  - Identify precursors to accidents and incidents, thereby allowing them to be addressed before they manifest themselves in damage and/or injury (accidents).

FOQA Components

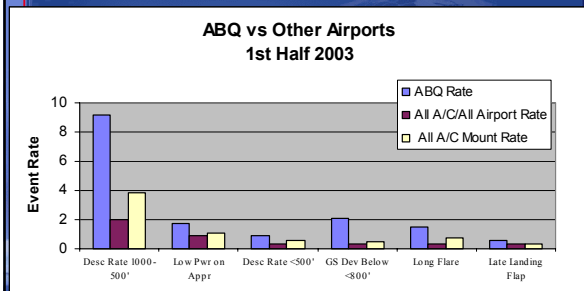
- Aircraft
  - Quick Access Recorder (QAR), similar to the Flight Data Recorder
- Aircraft Ground Crew
  - Downloading Device
    - Captures data from QAR and sends it to the FOQA Office
- Ground Data Replay and Analysis Station (GDRAS)
  - Computer database kept in the FOQA Office

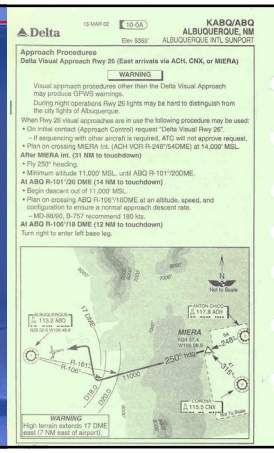
The FOQA Process

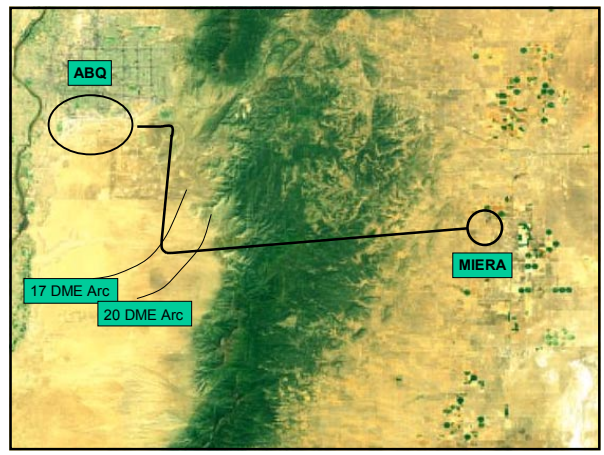
- The GDRAS replays the flight data from the QAR
- The program is "mined" to identify flight parameters that exceed pre determined limits
  - High Descent Rates
  - Abnormal Flap Configurations
  - Unusual engine performance

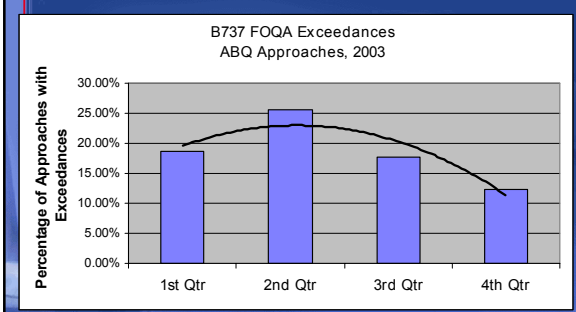
The FOQA Product

- The exceedance events are cataloged in the database for trending
- Trend Data is used
  - To enhance training effectiveness
  - To modify operational and ATC procedures
  - To assist technical operations with maintenance troubleshooting
- Results of analysis are provided to appropriate departments for corrective action









Runway excursion, Dublin, Ireland

Strategy

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Take your kid to work day at Delta

Line Operations Safety Audit (LOSA)

- Proactive safety program
- One audit approximately every 4 years
- Collects and analyzes data from the Flight Operations environment via cockpit observations and surveys.

LOSA

- Purpose
  - Provides a comprehensive review of Delta's daily flight operations culture and provide a means to evaluate threat-and-error management by our flight crews.

Key Elements of a LOSA

- Non-jeopardy environment
- Data is de-identified so that a particular flight and/or crew cannot be tracked.
- Non-intrusive style

LOSA

- How does it work?
  - Data collected via written surveys and jumpseat observations
  - Data is analyzed by Human Factors experts from the LOSA Collaborative at the University of Texas and areas of improvement are recorded
  - Deficient areas are addressed within the company

B757-200 Taxi Collision

B757-200 Taxi Collision

Aviation Safety Action Program (ASAP)

- Joint Delta/ALPA/FAA proactive program
- Program currently in development at Delta
- Collects and analyzes reports from employees regarding system hazards.

ASAP

- Purpose
  - "The objective of ASAP is to prevent accidents and incidents by encouraging employees of certain certificate holders to voluntarily report safety issues and events."
    - From FAA Operations Inspector's Handbook 8400.10, Chapter 5 (Voluntary Safety Programs)

Safety Interview (Debrief)

ASAP

- Key Elements
  - Proactive safety problem identification and resolution
  - Strong reporting incentives
  - Airline and employee commitment, response, and accountability
  - Flight Safety benefits to the company, the pilots, the FAA, and the flying public

ASAP

- How does it work?
  - Employee files ASAP report
  - ERC reviews report for inclusion in program
  - ERC investigates event
  - ERC issues recommendations (solutions or corrective action)

B767-300ER
Loss of APU doors in flight

Right elevator damage

B767 Core cowling - LAX (right side of core cowling)

B767 Core cowling - LAX (left side of core cowling)

Flight Safety Investigations

- Based on NTSB philosophy
- 4 full-time investigators for flight safety events
- 24/7/365, world-wide coverage
- 2 ex-NTSB, 1 Delta pilot, 1 Delta maintenance specialist
- Major accident- incident- irregularity

"Operational Threats"

Precursor (Incident)	Worst Case (Accident)
• Runway Incursion	• Collision on Runway
• TCAS RA, NMAC, Altitude Deviation	• Mid-Air Collision
• Smoke/Fumes • In-Flight Fire	• Loss of Controlled Flight
• EGPWS Event	• CFIT

Incident Classification

- NTSB-defined incidents
- Delta-defined incidents
  - High speed RTO (with 5% of or > V1)
  - Runway incursion
  - Altitude deviation (> 500')
  - Gross navigation error
  - Runway excursion
  - Serious GPWS or terrain event
  - Unstabilized approach
  - Attempted landing at wrong airport or runway
  - Evacuation slide deploys in flight
  - External door opens in flight
  - Dropped object
  - NMAC (< 500')

Safety Recommendations

- Recommendations, not orders
- Based on findings of safety investigations
- Targeted to operational departments
- Tracked by Flight Safety, ¼-ly reports
- Recommendations are coordinated closely with each department
- Director-level or above has responsibility for implementation

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Why is it so important to quickly disseminate safety information?

- So all employees (pilots) can learn from others, both within and outside Delta Air Lines.
- Promote dialogue among pilots as well as with Flight Safety on pertinent issues.
- Stimulate interest in Safety Issues among the pilot group.
- Increase visibility of Flight Safety to the pilot group.
- Promote facts not rumors.

Communication Programs

- Flight Safety APB Magazine
- Flight Safety Website
- Pilot and Maintenance Bulletin Boards
- Safety Summits
- Electronic Safety Bulletins


APB
ALL PURPOSE BULLETIN
Delta
Flight Safety
October 2002 — A Corporate Safety & Compliance Publication — Volume 3, Issue 3
Midair In Europe
in this issue

Uncontained engine failure

Pensacola, FL, 2 fatalities

Uncontained engine failure

Pensacola, FL, 2 fatalities

Measuring Safety Performance

- Weekly and Monthly Cycles
  - Weekly cycle tracks events for that week.
  - Monthly cycle tracks all events and incident categories.
- Goals set by Delta Board of Directors

Summary

- Triangle of Proactive Safety Programs
  - FOQA
  - ASAP
  - LOSA
- Measurement on a weekly and monthly cycle.

"Efforts and courage are not enough without purpose and direction"

John F. Kennedy 1917-1963